412 Each mistress of a tent has a little
356 wooden scraper to clean the floor of the tent, which is generally
342 covered with a layer of fine sand taken from the bed of the nearby wadi.

415 Let us add one or two earthen pots, little teapots and tea glasses, and we have an idea of Tuareg furniture, which, as one may realize, is reduced to the simplest terms.

484 When a camp is moved, all these objects are loaded on asses,
492 provided for the occasion with little pack saddles. The women are
[462] left with folding the baggage, loading it, and transporting it on the asses. They themselves ride on the baggage during the moving;
[565] only noblewomen travel on camel back. Camels are used in moving only if it is a long trip.

/230/ Chapter 3

Food

243 People may have said that the Tuareg, like many herding
262 peoples, lived on the milk from their herds. More precisely, they live on the products of their animals, but milk and meat alone would not be enough. Indeed, the base of their diet is a graminacea, bechena (Sorghum cernuum Host.), a kind of millet cultivated in the Saharian oases and in the Sudan.

The Tuareg eat some wheat, but very rarely. Especially during
[252 their moves and in the caravans, they eat wheat cakes cooked in
484] the sand, for they are easily and quickly made.

It is rather curious to note that the Tuareg, who belong cultural-
[101] ly to the Mediterranean civilization (which may be called the wheat civilization), have not kept wheat as the basic food as other North African peoples have. And yet the question of food is one of the things which most ties man to his native milieu and which

243 he generally carries with him in his migrations. Wheat raising
262 goes down to the Sudan as far as Timbuktu, Aïr, and a little north of Nigeria; but everywhere it has been introduced recently, due to the influence of the Arabs, who have not abandoned their traditional food.

Béchena is a food they adopted because of their exodus toward the Sudan; they are at the present time much closer to the Sudan than they are to North Africa from the point of view of material living conditions, that is, unless this plant formerly existed in a self-sown state in the Sahara, as Professor Chevalier has assumed, and was one of the principal food resources of its first inhabitants.

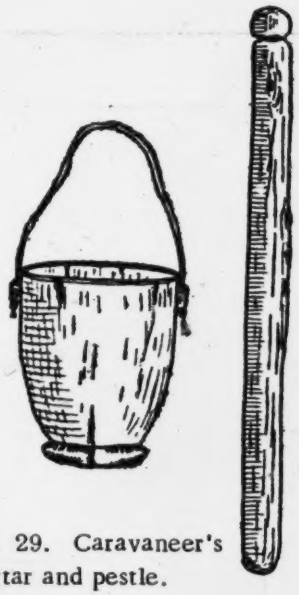

Fig. 29. Caravaneer's mortar and pestle.

177 By its agriculture
241 and its production, the Sahara is completely Negro. Agricultural methods, except for irrigation, /231/ are borrowed from the Sudanese, especially work with the hoe (daba), while North Africa mainly uses the plow which is unknown in the intertropical zone.

252 Béchena is eaten as a cooked flour porridge, as raw flour, or
262 mixed with liquids, water or milk.

Dates also play a large part in the diet of the Tuareg. Every year each family head organizes a little caravan to the Touat or Tidikelt to bring back two or three loads of poor-quality dried dates which are crushed with a pestle and eaten with camel's milk.

tanned and sewed together. The assemblage of these hides [281] constitutes the cover, the essential part of the tent, and is 342 called "ehakit" ⵄⵀⴰⴽⵉⵜ .

The tent is supported by a central master beam called "tamankaït" ⵜⴰⵎⴰⵏⴽⴰⵢⵜ .

A pole, "idjem" ⵉⴷⵊⴻⵎ , is placed at the entrance of the tent and is flanked right and left by poles called "madar'en" ⵎⴰⴷⴰⵔⵄⴻⵏ . /26/

Other poles are used to hold up the edges: these are the "tissedass" ⵜⵉⵙⵙⴷⴰⵙ . The little pegs that hold the tent to the ground are called "tisselitaï" ⵜⵉⵙⵙⵍⵉⵜⴰⵢ . Sometimes bows are also used, called "adjedjou" ⴰⵊⵊⴷⵓ , plural "idjedjan" ⵉⵊⵊⴷⵊⴰⵏ .

The tent is surrounded by mats of "afezzou" ⴰⴼⴻⵣⵣⵓ [285 (Panicum turgidum, Graminaceae), called "asabar" ⴰⵙⴰⴱⴰⵔ 824] plural "isebran" ⵉⵙⴻⴱⵔⴰⵏ , which are pulled back in the day and drawn close at night, to close the tent.

In the tent one finds first that which concerns water, that 352 is, waterskins, "abe'lor'" ⴰⴱⴻⵄⵍⵓⵔ , plural "ibiyar'" 415 ⵉⴱⵉⵢⴰⵔ , hung on forked sticks, "tidjettaouin" ⵜⵉⴷⵊⵊⴰⵓⵉⵏ . They are filled by means of a funnel, "asegueffi" ⴰⵙⴻⴳⴳⴻⴼⴼⵉ , plural "iseguеffa" ⵉⵙⴻⴳⴳⴻⴼⴼⴰ . To water the camels, the 231 Tuareg use troughs of hide supported by hoops at the top and called "tafaraout" ⵜⴰⴼⴰⵔⴰⵓⵜ , plural "tiferouin" ⵜⵉⴼⴻⵔⵓⵉⵏ . They also use these troughs for the harvest of "toulloult" grain 243 (Arthraterum pungens, Graminaceae) or of "afezzou" (Panicum turgidum, Graminaceae).

For milk and butter, they have a waterskin for milk, 415 "tanouart" ⵜⴰⵏⵓⴰⵔⵜ , plural "tinouarin" ⵜⵉⵏⵓⴰⵔⵉⵏ , and a kind of porous water jug made of a hollowed gourd and called "az'enou" ⴰⵣⵄⴻⵏⵓ . To ladle the milk, serve it or pour it, they use a wooden vessel with one handle called "asoukal" ⴰⵙⵓⴽⴰⵍ . To store and transport melted butter, "oudi, " they have waterskins of various shapes, the most common being the one called "tahattint" ⵜⴰⵀⴰⵜⵜⵉⵏⵜ , but they also sometimes [281] use the tanned hide of a camel's thigh. /27/

usually satisfied with milk, "akh, " fresh ("akh oua kefa'len" 264
[illegible]) or sour ("akh iezza", [illegible]), at
the hour when the camels, sheep, or goats come in from
pasture.

The basic food of the Ahaggar Tuareg consists of bechna, 262
"inelli" (white-grain sorghum, Graminaceae), dates, "te'lni, "
and milk, "akh. " [illegible]

But their country provides them with many resources 22
which they are careful not to neglect, especially the poor, 556
the "tileqqiouin" [illegible] , who constitute the majority.

All the "imr'ad" go to harvest the grains of "toulloult" 243
and "afezzou. " Women, children, youths, negroes and 221
negresses go into the wadis
to gather the harvest, which
takes place from May to June
for "toulloult" and from July
to the end of September for
"afezzou. " /29/

[000]

Dautheville

Idelés (Koudia)

Usually, before the
harvest several wadis are for-
bidden territory, and camels
are not led there until the
harvest is finished.

The produce is gathered
and put into hide sacks. After the grains have dried, they 252
need only to be put onto small trays of "afezzou, " called
"tissiin, " which are shaken, and the hulls fall off and remain
on top. The grains are ground to powder, and a kind of gruel
is made with water or butter.

The Tuareg are also very fond of "tikamarin" [illegible] 234 252 262
, cheeses as hard as wood which they get from A'ir. They 438
grind them in mortars and mix them in their food.

They very seldom eat meat, except that of game which 262
they can kill in a hunt: gazelles, mountain sheep, and 224
antelopes. But often they prefer to smoke this game in order 251
to go and sell it in the Tidikelt. 438

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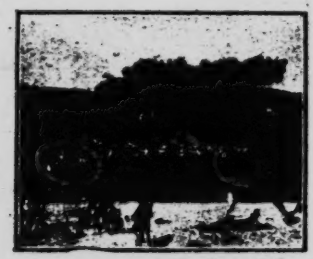
The nobles eat better, at least those who are well-to-do. In the Ahaggar especially they own cultivated land in the "ar'erems" (villages), where they grow wheat, "ired," barley, "timzin," and bechna, "inelli"; but usually they sell their

[137]



Dautheville

Trees Called "Ahatés" (Acacia Albida) at the Tillemas of the Tessht Wadi (Koudia).

wheat and barley to the natives of the Tidikelt and are content with bechna, of which they are very fond. They claim that [824] bechna is less heating to the stomach than wheat or barley.

The rich allow themselves the luxury of drinking tea, but tea and sugar are very expensive, and they do not misuse them. On the other hand, they do not hesitate to beg for them shamelessly.

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When the year is bad anything seems good to the poor to assure their subsistence. In such years one sees them eating /30/ "berdi," or "taheli," (Typha angustifolia, Typhaceae); ground carob seeds of "talhas," or gum trees, which they call "tahaha" ⋮⋮+ ; "tanékfa'lt (Diplotaxis duveyrierana, Cruciferae); fruit of the "teborak" (Balanites aegyptica), which they steep to take out the bitterness; and even leaves of the "aremmas" (Atriplex halimus, Salsolaceae), which they boil.

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In short, nature keeps food resources for them which prevents even the poorest from dying of hunger.

7:Nicolaisen E-5 (1951-1962) 1963 MS25 Tuareg MS25

241 I, p. 424). Rodd thinks the implement seen by Barth was clearly an importation from the north (Rodd
171 1926a, p. 133), and Feilberg assumes that if the plough was once known in this southern area it might perhaps have disappeared together with shifting cultivation (Feilberg 1931, p. 200). All this may be so, for there has been much contact between Ayr and the regions of Fezzan and Tripolitania in the past. But Barth does not say that he saw a plough but "a kind of plough", which may perhaps point to a type of large hoe drawn by men like that described from Senegambia by Feilberg (cf. Feilberg 1931, p. 169 f.).

● 243 The plough is unknown in the extensive area inhabited by pastoral Tuareg but this is not so with a kind of shifting cultivation. Pastoral Tuareg of Tasilé-n-Ajjer sow wheat and barley along the river valleys when these have been heavily flooded. Sowing is then done in a very simple way:— Holes are dug into the sandy soil, usually merely with the hand, and a few seeds are put into these holes. Wheat and barley thus sown grow in tufts with a space of 0.30 to 0.50 metres between each, and there seem to be about fifty straws in a normal tuft – the largest tuft I have seen contained about 130 straws (cf. Figs. 128–129). The plots cultivated in this way are generally very small, and the scattered wild plants growing in the plot are not always removed before sowing. The corn plots are left completely to themselves until harvesting, which is done with a sickle (Fig. 143). Primitive corn growing of this type cannot be practised continuously from one year to another in Tasilé-n-Ajjer, and the Tuareg of that region say that a household never grows enough corn in this way to meet its annual needs.

[178] The primitive method of corn growing without artificial irrigation is unknown in Ahaggar nowadays, but it seems as if it was known in the past (cf. Duveyrier 1864, p. 372), and the Ahaggar Tuareg have a particular term (*iawgest*) for a field cultivated without artificial irrigation (cf. Foucauld 1951–52, III, p. 1466).

Rodd states that rain-grown crops could be raised most years in certain parts of Ayr and that in earlier days a fair amount of cereals seems to have been produced in this way in Ayr (Rodd 1926a, p. 133). There is little doubt that this statement is correct, and I think that even in parts of Ahaggar millet could be raised without irrigation in most years, for millet has a very short period of growth.

[22] In Ahaggar (at Abalessa) it is sown in June-July and is harvested in September. Though millet plots are irrigated they are never watered much, and never to the same extent as wheat and barley which are grown in winter. In regard to Ayr, millet in southern villages of the Massif very frequently ripens in two months, and late in summer, at the end of the rains (*akasa*) or in the early dry season (*rarat*).

[252] I have frequently seen well-developed small plots of millet and sorghum around deserted Tuareg camps where a great many seeds are always lost on the ground during the pounding and winnowing of millet for porridge. These self-grown plots, however, are not utilized by the Tuareg as the comparatively

[134] small yield is quickly eaten by the numerous millet-eating birds. Owing to these birds it would be difficult for pastoral Tuareg to grow cereals in flooded valleys like the Tuareg of Tasilé-n-Ajjer, and it is partly for this very reason that the sedentary agriculturists of Ayr grow very little millet. Millet could easily be raised without artificial irrigation during the rains, and, in fact, millet was grown by shifting cultivation not far from Agadez as recently as up to the French occupation of Ayr.

245 In addition to the species of grain mentioned above there is one very important plant which can be grown without artificial irrigation, namely the date palm. In Tasilé-n-Ajjer there are river valleys

7:Nicolaisen E-5 (1951-1962) 1963 MS25 Tuareg MS25

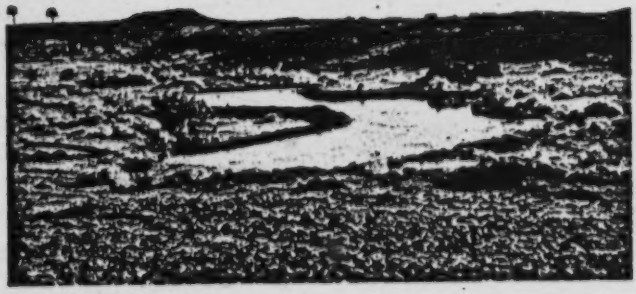

Fig. 133. The large water basin (*ilkemi*) from which water is led into the gardens. Ahaggar, Abalessa.

(*teɣuhami*, or *tahafi*) from which another canal (*tahafi*, or *teɣuhami*) leads water out into the garden, which is always divided into a large number of garden beds (*igemmunen*, sing. *agemmun*) surrounded by low ridges and separated by narrow irrigation canals. The large water basin serves to regulate watering, which outside of the very cold season is done during the night. A flat stone with a hole in its middle and known as *anefif* is placed between the basin and the canal leading water into the garden; water for irrigating the garden flows through this hole when irrigation is needed at night, while the hole is closed by means of a cotton stopper during the day. The basin is thus filled with water during the day and its water runs into the garden at night (cf. Figs. 131–136).

The irrigation systems described are most important for the cultivation of the winter crops of wheat and barley. The Tuareg word in Ahaggar for wheat is *éred* which is a collective name for several types of wheat known as *elkhamra*, *elmansuri*, *amekkawi*, *tati*, and *menga*. These special names seem to be derived from Arabic (cf. Foucauld 1951–52, III, p. 1058, 1211 & IV, p. 1789; Maire 1933, I, p. 246). According to Maire these types of wheat belong to the species *Triticum aestivum*. I have never myself seen fully-grown wheat in Ahaggar and was thus unable to collect ears for identification by botanists, but seeds brought home from Ahaggar and Tasilé-n-Ajjer have been identified by Dr. Hans Helbaek as belonging to common bread wheat. Barley is known to the Tuareg as *timzin*. Threshed seeds brought home from Ahaggar have been identified by Dr. Helbaek as belonging to the six-rowed type (*Hordeum vulgare*, though some, he thinks are perhaps of the two-rowed type (*H. distichum*). Barley, like wheat, is a winter crop though less common. At Abalessa I was told that two thirds of the seed-crops grown in winter were wheat, while only one third was barley.

Wheat and barley are grown in the same way. Sowing is done in the autumn (*tober*), and the seeds are put into the garden beds with the fingers. Harvesting takes place in the month of April (*ibri*) and is performed with a sickle (Fig. 143). The growing of wheat and barley is a very strenuous task for irrigation agriculturists. Watering is done for the first time immediately after sowing. When I stayed at Abalessa, in the month of January 1955, the tender plants of wheat and barley were watered two days in succession, and the 10–12 gardens belonging to the same *foggara* were irrigated in succession in this way. At that time of the year the plots are not generally watered at night because of the cold temperatures which may be below zero.

7:Nicolaisen E-5 (1951-1962) 1963 MS25 Tuareg MS25

temperatures which may be below zero. At a later date the plants of wheat and barley are watered less frequently, and watering ceases completely some time before harvesting in order that the plant may ripen more easily.

The agriculturists of Ahaggar do not manure the garden plots used for wheat and barley. Only a new garden plot never previously cultivated is manured, and when such a garden is made the wild vegetation of grasses, herbs, bushes, and trees is often set on fire. Wheat and barley can be grown in the same garden plot for three or four years in succession, and the soil then needs at least one year's rest. In this way, the same garden plot can be kept under cultivation for many years without manuring: this continuous cultivation on the same spot with a one year's rest for each three or four years cultivation is possible partly because there is a certain crop rotation with other plants grown in summer, but mainly because the agriculturists during the period wheat and barley are grown carry fresh soil to their gardens. This is done not only before sowing but also throughout a long period of the winter when the plants are tender and green. When I stayed in the settlements of Abalessa and Amsel in the months of January and February (1955), all agricultural households worked strenuously from morning to night carrying soil to the green garden plots of wheat and barley. The soil was carried in plaited baskets (cf. Fig. 135) on the head, or in bigger baskets carried by donkeys. The soil was left in small heaps (one in every garden bed) to be spread over and between the green plants (cf. Fig. 137). This extremely strenuous work, I was told, would continue until the month of March.

In spite of the fact that cultivation in Ahaggar is done intensively and much work is connected with it, the yield of winter crops is not a very considerable one. In Abalessa it is said that seed-corn of wheat and barley will normally amount to about 50 kgs, and about 500 kgs is to be considered a normal yield, though certain gardens which are extremely well cultivated may yield more and in rare cases up to one thousand kilogrammes. The gardens I saw at Amsel and Taṛhawhawt were smaller than those seen in Abalessa. At Taṛhawhawt the quantity of wheat and barley sown, was said to amount to about 35 kilogrammes.

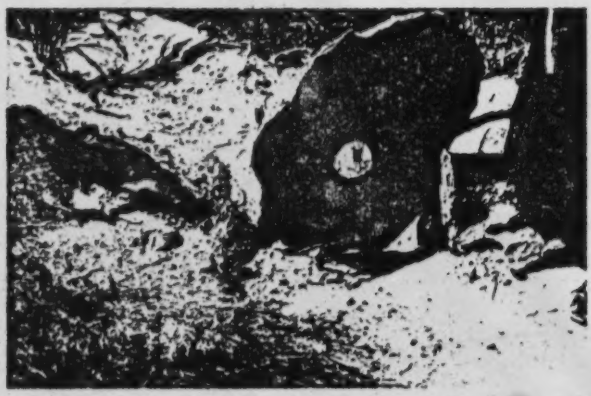

Fig. 134. The flat stone (*awaſſ*) inserted between the water basin (*tiheret*) and the canal (*tefahawt*) which leads water towards the gardens. Irrigation stops and the basin runs full of water when a cotton stopper is put into the round hole in the middle of the flat stone. Ahaggar, *Ahl Azzi* Arabs.

7:Nicolaisen E-5 (1951-1962) 1963 MS25 Tuareg MS25

243 [262] Wheat and barley grown in winter constitute the most important crops in Ahaggar, but, as mentioned, the gardens are also cultivated at other seasons, and crops of millet and sorghum taken in summer are most important substistence for irrigation farmers in Ahaggar. Millet is known to the Tuareg as [171] *énélé*; it seems to be the same species as that so widely grown by African agriculturists of the savannah countries (*Pennisetum typhoideum*, or *P. Americanum*). Millet is sown in June-July and harvested in September, or in October. Little work is involved with the cultivation of this plant which is never watered [221] much (cf. p. 184), and the agriculturists do not carry fresh soil to the millet plots as they do to plots of [461] wheat and barley. Species of sorghum are less important than millet. The common species is known as [386] *abora* or *tafsut* (*Andropogon Sorghum*). Another species is known as *tallak*; it has smaller seeds than the species just mentioned, and is grown mainly because of its stems, which are reduced to powder to be used for dyeing skins red (cf. p. 282).

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Fig 135. Basket (*tdesait*) of the type used for transportation of fresh soil to old garden land. It is plaited from straps of date palm leaves (*afaus*) and has handles of rope made from date palm bast (*asas*). Soil is also carried to gardens in larger baskets (*tdyerirt*, pl. *tiyrar*) loaded on donkeys. Ahaggar, Abalessa. Dimension: 0.22 m high, 0.35 m in diameter at the rim. (N.M. G. 3285).

7:Nicolaisen E-5 (1951-1962) 1963 MS25 Tuareg MS25

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Fig. 136. Irrigation of a young wheat-plot. The canal ridges are opened with a hoe in order to let water penetrate into the garden beds. Ahaggar, Abalessa.

to be used for dyeing skins red (cf. p. 282). Maize (*Zea mays*) is also grown as a summer crop in some of the cultivation centres; it is called *engafulé*, or *engafulé masri* (masri = Egyptian) because it is said to have been introduced from Egypt.

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Tomatoes (*tomatem*; *Solanum lycopersicum*) are grown mainly in summer and constitute a very important crop. The ripe fruit is sliced and left to dry on a layer of straw in the garden. They are crushed and pounded and are added to various dishes, e.g., the so-called kuskus (*keskesu*, cf. p. 247). Various types of melons and gourds are also grown in summer, e.g., the water melon (*taleǧezt*; *Colocynthis Citrullus*), a type of ordinary melon known as *tétakelt* or *tazenut* (*Cucurbita* sp.) which is frequently sliced and dried in the same way as tomatoes, and a kind of large gourd (*kabuya*; *Cucurbita maxima*). Certain other vegetables are grown in most gardens, notably various kinds of onions (*téskert*, *Allium sativum*; *éfeleli*, *Allium cepa*) and a kind of beans known as *tadellaḳ*. A few plants are grown as spices, e.g., saffron (*taneṛmit*, *Crocus sativus*), red pebber (*chiffa*, *Capsicum annuum*), or for tea-admixture, e.g., the mint (*émeṛner*, *Mentha piperita* var.) and a plant known as *lahabok* which is said to have been introduced from the Sudan. Two very poisonous plants are also grown in certain gardens of Ahaggar, namely *éfelehleh* (*Hyoscyamus muticus* ssp. *falezlez*), which also grows wild in the lower country (cf. p. 178), and *burzig* (*Datura Stramonium*) (cf. Maire 1933, I, p. 191 f.). Foucauld mentions two other plants grown for their medicinal value (*ibedliwen*, *Trigonella foenumgraecum*; *tikamnin*) (Foucauld 1951–52, I, p. 33 & II, p. 812). A kind of wild salad (*tamaghé*) is also grown in the gardens according to Foucauld (Foucauld 1951–52, III, p. 1170). Potatoes (*Solanum tuberosum*) are now grown in some of the mountain oases – mainly for selling to Europeans at Tamanṛaset. Among other cultivated plants found in the gardens of Ahaggar mention can be made of the following species after Maire:—

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Lepidium sativum, *Brassica Rapa* & *B. oleracea* (*aharet*), *Linum usitatissimum* (*ilatelé*, or *anarka*), *Medicago sativa*, *Pisum arvense* (*demchi*), *Vicia Faba*, *Lens culinaris* (*elṛedes*), *Vigna catjang*, *Cori-*

7:Nicolaisen E-5 (1951-1962) 1963 MS25 Tuareg MS25

Fig. 137. The fresh soil carried to old gardens is placed in small heaps to be spread out between the tender plants of wheat and barley. Ahaggar, Abalessa.

andrum sativum, *Cuminum Cyminum* (*azkar*), *Daucus Carota* (*ezzerugt*), *Cucumis melo*, *Lagenaria vulgaris* (cf. Maire 1933, and particularly Maire 1940, p. 401).

In addition to the above-mentioned plants there are various types of fruit trees which do not play any considerable rôle for food. The gardens contain very few date palm trees (*tazzayt*, *Phoenix dactylifera*) and there are no palm trees of any value in the gardens situated in the upper mountain zones where the fig tree (*tahart*, *Ficus carica*) thrives much better than in the lower country; the figs are consumed fresh, or they are put on strings for drying, common practise elsewhere in North Africa. The pomegranate (*terrummant*, *Punica Granatum*) is grown in some gardens; its fruits are eaten, and they are also used for dyeing skins (cf. p. 282). Grapes (*tezzebibt*, *Vitis vinifera*) are also grown in some gardens.

Maire mentions the cultivation of the peach (*Prunus Persica*) and the apricot (*Prunus Armeniaca*) (cf. Maire 1940, p. 401). These fruit trees have undoubtedly been quite recently introduced for Foucauld states that they are not grown in Ahaggar (cf. Foucauld 1951–52, I, p. 79 f.).

There are nowadays many agriculturists who have their private gardens so that they cultivate their winter crops and their summer crops entirely for their own use. But most agriculturists grow winter crops of wheat and barley on behalf of the Tuareg who are then the true garden owners.

Agriculturists who cultivate their gardens on their own behalf frequently irrigate crops by means of draught animals (zebus) which raise water from wells, but there are also some farmers who cultivate independently without any contract with pastoral Tuareg and nevertheless belong to a *foggara* team. It can be estimated that an independently working agriculturist obtains a total yield of about 700 kilos of wheat and barley grown in winter. Of this yield he gives 10 kilos to the *Amenukal*, or to the

7:Nicolaisen E-5 (1951-1962) 1963 MS25 Tuareg MS25

of this yield he gives 10 kilos to the Amenukal, or to the 243 ●

Tuareg who has territorial rights (cf. p. 151), while the yield of one garden bed – that is about other ten kilos – is given to a blacksmith who in return mends hoes and other agricultural implements. The necessary amount of seed-corn, comprising about 50 kilos, should also be withdrawn from the winter crop yield so that his total net profit is about 630 kilos of wheat and barley. To this amount of cereals can be added the yield of summer crops (millet, sorghum, maize, tomatoes, and other vegetables) for

[151] [962]

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Fig. 138a–c. Grown cereals from Ahaggar.
a. Millet (*énlil*) (*Pennisetum typhoideum*). b. Two types of sorghum (*akoro*, *tafsut*).
c. Maize (*zengafad*) (*Zea mays*).

7:Nicolaisen E-5 (1951-1962) 1963 MS25 Tuareg MS25

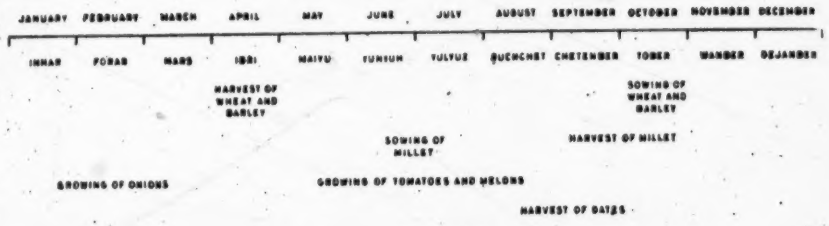


Fig. 139. Horticultural calendar from Ahaggar.

The Tuareg and the negroid agriculturists have a lunar calendar of twelve months corresponding to the Arab calendar, but a lunar calendar has no practical value for the indication of seasonal agricultural activities. The Julian Calendar is known to some people of Ahaggar as well as to other Berbers of the Sahara and the Atlas. Tuareg names of Julian months are given above. Very few people in Ahaggar know the exact beginning and the end of the twelve Julian months, but a few names are used as seasonal terms: *innar* "midwinter", *mars* = "beginning of spring", *ibri* "early harvest" (of wheat and barley), *maiyu* "beginning of summer", *tober* = "late harvest" (millet).

which no definite figures can be given, while the yield of fruit trees growing in the garden plot does not necessarily belong to the agriculturist. These trees frequently belong to pastoral Tuareg.

I think it can be estimated that an agricultural household with its own garden produce about a thousand kilos of vegetables food products annually for its private use. We can add that though the members of an agricultural household live mainly on vegetable food products they also acquire a certain amount of food from livestock, which normally comprises a few goats and sheep, and perhaps one or two zebus. Conditions of stock-breeding are not always favourable to people who live continuously on the same spot, but it is advantageous to the agriculturists of Ahaggar, who live close to valleys with some pasture, that they are able to feed their animals on green garden products when pasture is badly developed and thus avoid the disaster of a drought. It is also an advantage to most agriculturists that they do not have to water their animals which can drink freely from the irrigation canals. The agriculturists can kill a few goats or sheep annually, they obtain milk and a little butter to be used mainly as a sauce for bread and porridge, and they make cheese of the *awles* type (cf. p. 224), but they never make cheese from fresh milk as do many pastoral Tuareg when milk is abundant. The agriculturists also breed fowls and pigeons, and some of them have an important meat supply from hunting with steel-traps (hares, jackals, fennecs, and ravens). Collecting, on the other hand, is of little or no value to irrigation farmers of Ahaggar.

The economic position of agriculturists who work without any particular obligations towards pastoral Tuareg is tolerably good. It is less favourable to those who grow winter crops also on behalf of the Tuareg, as do most cultivators. Some of them irrigate the garden plot with water raised from wells by oxen which may belong to the cultivator or to the Tuareg. But most agriculturists who work for the pastoral Tuareg irrigate by means of *foggara*. It is very strenuous work to dig a *foggara* canal, and co-operation is needed not only for this but also for the maintenance of the whole irrigation system. The gardens are individually tended by the agriculturists, who co-operate in the *foggara* work under the leadership of a headman known as *amɣar n efeli*, that is "chief of the *foggara*". This headman is

7:Nicolaisen E-5 (1951-1962) 1963 MS25 Tuareg MS25

appointed by the Tuareg garden owners and is rewarded by a garden of his own for his responsibility in supervising all co-operative work. The unit of agriculturists co-operating at the same *foggara* may or may not correspond to an extended family. The agriculturists co-operating on any large *foggara* irrigating ten or twelve gardens frequently represent two or three distinct families which are not linked to each other by kinship bonds. The cultivators of a *foggara* comprising nine gardens at Taṛhawhawt belong to three distinct, unrelated families. This is quite natural in view of the fact that contracts between the Tuareg and the cultivators are made individually.

There may also be no kinship bonds between the pastoral Tuareg who have gardens at the same foggara, and there are even Tuareg who own two or three gardens situated in widely separated river valleys of Ahaggar. But Tuareg garden owners of the same foggara frequently belong to the same tribe or even to the same tribal section. When a garden-owning Tuareg dies, his garden will generally pass to somebody within his family, but there seems to be no fixed rules governing the transference of gardens.

The individual contract between a Tuareg garden owner and his cultivator is made for a period of six months – the period of growth for wheat and barley. The agriculturist is responsible for all garden work, and the Tuareg garden owner has the following obligations:—

(1) To supply his cultivator with a hoe every year, or every two years in case a very good hoe is given.

(2) To pay for repairs of the *foggara* system, or for the digging of a new *foggara*. This payment is known as *almarsor* and consists of two kilos of cereals or dates every working day until water reaches the garden.

(3) To pay for the making of garden beds. This payment is known as *éhéré n egalob*, and is made only once as long as the garden remains on the same spot. When a garden is moved after a period of three or four years the payment must be made again. It varies with the size of the garden and the quality of its soil; in general it consists of 15–25 kilos of cereals.

Fig. 140. Millet (*énélé*) of very high growth. It is said that this particular millet type was introduced to Ahaggar from the south – possibly from Ayr. Ahaggar, *Ahl Azzi* Arabs.

7:Nicolaisen E-5 (1951-1962) 1963 MS25 Tuareg MS25

tion that subsisted on agriculture. Most members of the *Kel Ewey* group are fairly negroid in appearance, and though some of them lead a nomadic life and subsist mainly on stock-breeding, the bulk of the *Kel Ewey* are sedentary agriculturists who have some livestock comprising goats, sheep, zebus, and sometimes camels also. Among the fair-skinned Tuareg of the *Kel Ferwan* drum-group there are very few sedentary agriculturists, though a few vassals have taken up irrigation agriculture in recent times. There are also agriculturists within the negroid group of the *Kel Ferwan* known as *Irawélen*. Some *Kel Ferwan* Tuareg have gardens cultivated by their slaves, but this is not customary nowadays when slavery is of little importance in Ayr. Contracts between pastoral Tuareg and cultivators are said to have been unknown until recent times when a few pastoralists have made contracts with cultivators. There seem to be no fixed systems regulating such relationships, but it is said to be common for the cultivator and the Tuareg to divide crops equally between them.

Though agriculture could be practised in Ayr without artificial irrigation there are no rain-grown crops within the Massif nowadays. The *foggara* system is unknown, and irrigation is done by raising water from shallow wells. The system of a pole and bucket provided with a counterweight known in Ayr as *aseftan* has disappeared quite recently. It was used at many agricultural settlements of Ayr until a few years ago, and in parts of the country formed the only type of irrigation system at the time of the French occupation. One informant told me that in his boyhood about 35 years ago no other irrigation method was employed at Alarses, and this is in agreement with literature (cf. Capot-Rey 1953a, p. 322). At that time, however, the method of raising water from wells by animal traction (in Ayr *anu*, in Ahaggar *tanut*) was also practised at many settlements. It is unknown when it came to Ayr, but it is said to have been introduced from the north – probably from the regions of Fezzan and Tasilé-n-Ajjer from where the same system came to Ahaggar (cf. p. 187). It is now used at all settlements as the only type of irrigation system, and zebu-oxen are always used for traction. This was not so in the past when zebus were less common than to-day, and it is said that donkeys were then the common draught-animals. The irrigation of gardens is performed in much the same way as in Ahaggar. The water raised from the shallow well (*anu*) is led through a narrow canal (*arelal*) to a large basin (*tisemt*) from where another canal (*duki*) leads to the garden (*afarag*), which is divided into a number of beds (*éfenral*).

Cereals form the most important crops in Ayr. The common winter crop is wheat (*elkama*; *Triticum vulgare*), but also barley (*Hordeum tetrastichum* var. *pallidum*) is very widely grown. One crop of these two cereals is taken every winter, and it is said that the period of growth is about five months; sowing is done in October, harvest in March. Cereals are also important for summer crops. Both millet (*énélé*; *Pennisetum typhoideum*) and sorghum (*abora*; *Sorghum caudatum*) are grown, and millet, as we have seen, has a very short period of growth – only about two months (cf. p. 184). But though millet is most important as food for agriculturists and pastoral Tuareg alike, it is not widely grown because it is difficult to protect it from the numerous small birds and because, it is said, millet grown in Ayr is of a quality inferior to that of the Sudanese type. Most of the millet eaten in Ayr is therefore imported from Damergu by pastoral Tuareg. By far the most important summer crop grown in Ayr is maize (*Zea mays*), which is known to the Tuareg as *abora maser*, that is "Egyptian sorghum" (*abora* = sorghum; *maser* = Egypt) (the name *maser* is also used to designate the white cotton used for garments

7:Nicolaisen E-5 (1951-1962) 1963 MS25 Tuareg MS25

by many Tuareg, who say that they have not always known this white cotton, though indigo cotton has been introduced from the Sudan since very remote times). Maize has a normal period of growth of about three months, and two – in certain places perhaps even three – yields are taken in the hot seasons.

In addition to the above-mentioned cereals there are various kinds of vegetables grown in the Ayr gardens. Tomatoes (*tomatem*; *Solanum lycopersicum*) are grown at most seasons with the exception of the dry and very hot summer period (*éwilen*). Also common in the Ayr gardens is the sweet potato (*dankale*; *Ipomoea Batatas*), which is sown at the beginning of the rains and harvested in winter. The true potato (*batata*; *Solanum tuberosum*) has been introduced more recently, and is grown mainly to be sold to European households in Agadez. It is grown in Eastern Ayr (Tabello). Melons (*Cucumis melo*) and water melons (*Colocynthis citrullus*) are grown all over Ayr and there are different vegetables such as onions (*Allium cepa* & *A. sativum*), which are harvested at most seasons. Two plants are grown mainly because they are important as admixtures to porridge sauce. One is called *ékabewwa* (*Corchorus olitorius*); it has maize-like seeds which are pounded in a mortar for sauce-making. The other plant is known as *malokhiya* (*Corchorus tridens*); its leaves are dried and pounded for sauce (cf. p. 243). The latter plant also grows wild outside the gardens. There are in Ayr also certain spice-plants, e.g., *Capsicum annuum* & *C. frutescens*. To all these cultivated plants can be added certain fruit trees, such as the date palm (*talesdar*; *Phoenix dactylifera*), the fig tree (*tahart*; *Ficus carica*) grown in the mountains, and the lemon tree (*lemon*; *Citrus aurantifolia*) which is grown in Southern Ayr; it yields very small fruit which remains green even when ripe. It should finally be mentioned that the cotton plant (*ebduga*; *Gossypium hirsutum*) is also grown in some gardens of Southern Ayr. According to Miré and Gillet it was introduced into Ayr by the Hausa, but the plant has also been introduced further north in the Sahara in Tawat (Miré & Gillet 1956, p. 244). As stated by Rodd, the cotton plant is rare in Ayr and has perhaps been recently introduced into this region (Rodd 1926a, p. 132). There are many other cultivated plants in Ayr, but the above mentioned constitute the most important species.

In Ayr, as in the north, irrigated cereals form the basis of agriculture. Irrigation is carried out by means of a system introduced from the north, and the agricultural techniques largely resemble those of that section of the Sahara inhabited by Northern Tuareg, though there are certain differences. A new garden in Ayr is prepared by cutting and burning away the wild vegetation of trees, bushes, herbs, and grasses. By crop rotation (wheat and barley in winter; maize, millet, and sorghum in summer) it is possible to cultivate the same garden plot for a few years in succession – up to six or seven years, it is said. After this time it becomes necessary to make a new garden, or to manure the old garden plot with camel and cow dung whilst manure (*taki*) from other animals or from human beings is said not to be used, as it would cause the crops to become inedible. A well-manured garden plot can be cultivated continuously for about fifteen years. But fertilizing is not practised by all agriculturists, and to my knowledge they do not carry fresh soil to the garden plots as is the case with the agriculturists of Ahaggar. Agriculture in Ayr therefore frequently resembles shifting cultivation, though plots are irrigated, and deserted garden land is frequently seen in the valleys where agriculture is practised.

7:Nicolaisen E-5 (1951-1962) 1963 .MS25 Tuareg MS25

AGRICULTURAL IMPLEMENTS AND THE PRESERVATION OF CROPS

241 412 The hoe forms the basic agricultural implement in Ahaggar and in Ayr. The type of hoe used in Ahaggar is known as *agelhim*, and it is akin to that in general use among irrigation farmers of the northern oases. It has a very large and heavy iron head provided with a ring for the shaft. I believe that this type of hoe is particularly fitted for irrigation work, but it does not seem to be in general use in Ayr. I have seen it at Iferwan in Northern Ayr where agriculturists have much contact with Tasilé-n-Ajjer, but I have not seen it further south in the Massif where it seems to be unknown. The common type of hoe in Ayr is different; it is named *tagumit* and is hafted by means of a tongue (Fig. [171] 143d). The same type of hoe is widely distributed in Africa south of the Sahara, and it is perhaps to be considered the oldest type of iron hoe within the continent (cf. Feilberg 1934, p. 228–278).

241 The hoe is used for agricultural work in general, for digging irrigation canals, making garden beds, and for the preparation of the soil. The hoe is not used for sowing cereals. Sowing in Ayr is known as *anabal* and is performed in the following way:— As many seeds as can be kept between the first and second fingers are pressed a little into the soil, and water is led into the garden beds immediately after sowing. I have myself never watched sowing, but I was told in Ayr that it was frequently done by old women. I think that this is probably connected with the belief in the mystic power known as [178] [841] *elbaraka* so characteristic of all North African peoples. For cereals contain this mystic power, which can be spoiled by unclean women. It is considered harmful to the *elbaraka* blessing if cereals are handled by menstruating women (cf. Westermarck 1926, I, p. 230). The hoe is used for weeding, 241 412 but the agriculturists of Ayr also have a special implement for this particular task. This is known as *elgechwad* and consists of a curved semi-circular iron blade hafted to a short wooden handle by means of a tongue (Fig. 143e). The semi-circular blade is sharpened at its outer and convex side which is pushed against the roots of weeds.

243 412 Various methods are used for the harvesting of crops. In Ahaggar and in Tasilé-n-Ajjer wheat and barley are always harvested by means of a sickle (*amreh*) (Fig. 143a–b). The sickle in Ayr is known as *elgechwad*, like the weeding implement mentioned above. It is not used for harvesting crops, but for the cutting of annual grasses to be stored for fodder (Fig. 143f). In Ayr both wheat and barley are 245 harvested by drawing the straws from the ground with the hands. In Ahaggar and Tasilé-n-Ajjer sickles are also used for harvesting dates, while the date-growing agriculturists of Ayr use another method. They do not cut the bunches, but proceed in the following way:— When dates begin to ripen they enclose every bunch in a plaited pouch to protect the fruit from the ravens and other birds. The dates are harvested one by one when they are ripe, while those not yet fully ripe are left to be harvested later. Harvest is done in this manner about once a week until all dates have become ripe. Maize in Ayr 243 is harvested by drawing the plant from the ground with the hand, and this work is normally facilitated by loosening the soil around the roots by means of the hoe. I do not know how maize is harvested in Ahaggar, where this plant is not so widely grown as in Ayr. Everywhere among agricultural people of Ahaggar and Ayr millet and sorghum are cut with a knife (Ahaggar, *elmusi*; Ayr, *ezegiz*) (Figs. 171–172).

7:Nicolaisen E-5 (1951-1962) 1963 MS25 Tuareg MS25

243
412

Fig. 143a-f.
a–b. Sickles of the type used for harvesting wheat and barley in Ahaggar. They are known as *amrek*, pl. *imrekn*.
a. From Tamanrasset. Total length, 0.271 m. (N.M. G. 5256).
b. From Abalessa. Total length, 0.365 m. (N.M. G. 5828).
c-f. Agricultural implements from Ayr.
c. The short threshing stick (*aburi*). From Iferwan. Dimension: 0.49 m. (N.M. G. 6618).
d. The hoe (*tagamit*) hafted by means of a tongue. From *Kel Ewey* Tuareg near Agadez. Dimension: 0.70 m. (N.M. G. 6615).
e. The semi-circular weeding implement (*elgeckwad*). From Iferwan. Dimension: 0.295 m. (N.M. G. 6617).
f. The sickle (*elgeckwad*) which is used for cutting annual grasses. From Agadez. Dimension: 0.305 m. (N.M. G. 6613).

241
462 It seems as if millet and sorghum are always harvested by women, while dates are harvested only by men. Other crops are harvested by persons of both sexes.

243 Threshing methods are the same in Ahaggar and Ayr. Wheat and barley, which are sheaved and dried before threshing, are beaten with a stick (Ahaggar, *aburi*; Ayr, *aburi* or *asedbaḳ*). This threshing stick is an unfashioned bough of trees or date palms/but a short and club-like implement is also frequently used in Ayr (Fig. 143c). Threshing of millet, sorghum, and maize is done by pounding in a

7:Nicolaisen E-5 (1951-1962) 1963 MS25 Tuareg MS25

243 415

Fig. 144. *Kel Ewey* woman winnowing grain by shaking it in a plaited bowl. Ayr. Iferwan.

243 [415] large mortar. Winnowing of cereals is performed by shaking the seeds in a plaited bowl or tray to let husks and other impurities be removed by the wind (Fig. 144).

251 343 The Northern Tuareg use the following means for storing of crops:— (1) *taddat*, that is a skin bag containing grain, dates, and the like, hidden under stones and rocks in the mountains; (2) *égend*, or *anu*, an underground storeroom lined with mats. It is used for cereals, including wild seeds, and is found both among agriculturists and pastoralists (Fig. 146); (3) *tarassana*, a grain silo built from stones and mud (Fig. 145). Nowadays such storerooms are not only used by agriculturists but also by pastoralists. However, this type of storeroom is said to have been introduced to Ahaggar with the introduction of irrigation agriculture about a hundred years ago, and was originally unknown to pastoral Tuareg.

[134] Among the *Kel Ferwan* Tuareg all storerooms for cereals are known as *téḍengewt*. The storing of vegetable food products in skin bags covered with stones or hidden under rocks is apparently unknown – perhaps because of the numerous small rodents and the rich insect life which includes numerous white ants. Underground storerooms like those of Ahaggar are used by agriculturists and pastoral Tuareg alike. They are frequently excavated so deeply that they can hide a grown man standing in

7:Nicolaisen E-5 (1951-1962) 1963 MS25 Tuareg MS25

237 Ayr Tuareg a piece of ram's horn may serve as an amulet case attached around the upper arm. Horns
*[415] of barbary sheep are used for butter containers among the Northern Tuareg (cf. p. 223; Fig. 165), who sometimes use a piece of pointed gazelle horn for daubing antimony around the eye.

281 The Ahaggar women cut skin and leather with a small knife (*telmusit*), and a piece of wood (*asettenu*)
462 and/or a stone (*tazzet*) are used for smoothing the skin which is then placed upon a particular wooden
[413] board (*elkeyleb*) (cf. Figs. 219a–d). The Ayr Tuareg do not make so much refined skin work. Women
*[415] among the Northern Tuareg conserve their implements for skin and leather work in a particular bag (*askagen*) which is made from leather attached to a bottom piece of horn (*isek*) (Figs. 220a–g).

[531] Northern Tuareg women take a great interest in their skin and leather artifacts, which are richly decorated with fringes and hanging tassels, and with geometric designs in different colours. I have
386 noted the following colours among the Tuareg of Ahaggar and Tasilé-n-Ajjer:—
822 (1) *baba*, indigo which is introduced from the south in the form of balls.

(2) *tawnkent*, which is also known as *tafidet* and *tanezezzeft* according to Foucauld 1951–52, IV, p. 1934. It is a yellowish mineral which yields an entirely black colour frequently seen on ornamented skin bags. The mineral according to the Ahaggar Tuareg is introduced from the south, while the Tuareg of Tasilé-n-Ajjer claim that they obtain their minerals of this type from Serdeles north-east of Rat. – A black colour which is also known as *tawnkent* is said to be made by the Tuareg of Ahaggar in the following way:— Pieces of iron are put into water contained in some small receptacle, usually a tea glass. This receptacle containing water and iron pieces is covered with a bowl or a similar object in order that the sun light cannot penetrate. After a few days the water turns into a black colour to be used for skin dyeing.

(3) *semento*, a green colour derived from a mineral or a powder introduced from the south. According to some Tuareg this green colour is also made by means of a vegetable powder introduced from the north, from the region of Mzab.

(4) *khodarbas*, a powder which yields a green colour. It is said to be introduced from the south (from Tawa) and to derive from a tree known as *tafnit*.

[524] (5) *errummen*, the fruit of the pomegranate tree known as *terrummant* (*Punica Granatum*). It is used with a white mineral (alum), known as *azref n Tawat*, and introduced from In Salah. Parts of the pomegranate fruit and of this mineral are mixed with water to be used for a yellow or yellow-brown dye which is applied to many decorated skin bags for ground colour.

(6) *temesaruak*, a mineral introduced from the north (Mzab). It produces a yellow colour.

● [243] (7) *herki*, a reddish brown colour obtained from a particular type of sorghum known as *tullak* grown in the cultivation centres of Ahaggar.

(8) *téderse*, a white colour obtained by placing the skin for about three days in a container with fresh milk to which a little salt is added. – Among Tuareg of Tasilé-n-Ajjer I was told that a white colour is also obtained from a kind of powder introduced from the Sudan.

386 Before use these above mentioned colours or dyeing materials are generally dissolved in water
[63] contained in a tea glass. When they are employed for the very fine geometric designs of leather bags they are daubed with a small knife known as *telmusit* (Fig. 219b).

[439] It is interesting that most dyes used by the Northern Tuareg are introduced from the north or from the south,

[Text continues on p. 284]

245

245 ARBORICULTURE--specialized cultivation of trees and shrubs for their fruits, nuts, berries, or other edible products (e.g., apple, breadfruit, coconut, cacao, coffee, orange, raspberry, tea, hops); special care and treatment of each (e.g., grafting, picking, drying, packing); viniculture; silviculture (e.g., raising of trees for wood pulp, soil anchor, screens, shade, decoration); organization of labor and production; etc. See also:

include a first subterranean part made of numerous wells of depths varying from two to four meters, linked together by a small canal serving as a water conductor; then comes a part on top of the ground in the form of a canal, first at the same level as the wadi, then at a slightly higher level. They empty into the distribution reservoirs (majem), which by secondary canals (seguia) carry water to the gardens to be irrigated.

These agricultural centers therefore extend along the wadi on both sides of its banks. The cultivators settle near their gardens and live in straw or reed huts or little clay houses.

There are five centers in the high mountains between 1, 500 and 1, 800 meters in altitude, but the majority are located between 1, 200 and 1, 500 meters. Some of them can be lower, such as Silet (730 meters) and I-n-Amegel (1, 030 meters).

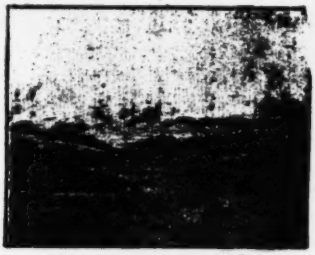
Some are small date groves such as Silet and Tibeghîn, which have 10, 000 palm trees, Ideles, Tâhârt, and Ăbalessa, but because of its altitude, the Ahaggar does not seem to be very suitable for date growing. The instability of the harratin is also an obstacle to the development of arboriculture which demands continual care. Cultivators who can be here today and gone tomorrow would not be capable of interesting themselves in work from which they could not draw immediate profit. The country would lend itself, however, to rather large-scale cultivation of peaches, /246/ apricots, figs, and grapes. The little center of Tăzerouk has many peach trees, and the center at Tit produces a famous raisin.

The Ahaggar soil is of a high quality, owing part of its richness to elements of volcanic origin which make up a large proportion of the alluvial deposits. Furthermore, the climate favors agriculture so much that the natives obtain two or even three harvests a year.

In the medium altitude centers, they sow wheat and barley in December and harvest it in May. Barely finished with this, they sow millet which is harvested at the beginning of October. In between the natives also engage in kitchen gardening: carrots,

241 Usually, there are six khammès per field, and each of
312 them has a right to water for one night and one day. The water, brought from the foggara, spreads into the "madjens," or reservoirs, as on the oases, there to be divided among the gardens by means of saguias, or irrigation canals.

[764]



Herhafok Region

In the Left Foreground an Ancient
Grave in the Chouchat Form
(Koudia)

241 The khammès receives as his pay:

1. A fifth of the crop
2. The barley which he sowed in the irrigation canals
3. A load of wheat in winter and a half load in summer, for his personal consumption.

245 In the Ahaggar there are also small oases of palms which were planted by no one knows whom, for example, at Tibedjehine and at Silet (Ahaggar), at Djor'raf, Tafarakrak, and Teguift (Immidir). The Tuareg who own them leave them untended and are satisfied to go and gather the dates when they choose. These palms, which get no care, also have a great mass of dry djerids hanging to the ground, which makes it very difficult to climb them. Perhaps this is to prevent theft of the dates? /76/

[423]

From the fact that these palms, even though not cared for, produce dates which, if not of good quality, are still quite

edible, and considering also that there is a very fine palm at 245
Abalessa (which could become a splendid oasis since there is
no lack of water), one may ask if the creation of an oasis of
palms in the Ahaggar might not be tried with success. But the [438]
Ahl Azzi and all the inhabitants of the Tidikelt, who live
entirely on the sale of their dates to the Tuareg, have persuaded

[361]

Haratine Gourbi at Ideles
(Koudia)

the latter to the contrary, that the climate of their country is
not suited to growing palms. Besides, the Ahaggar do not in [185]
the least wish to undertake plantations from which one could
expect no profit for several years, and they prefer to stay with
growing wheat, barley, and bechna, which pay at once.

The Amenokal Moussa ag Amastane, realizing that the era 643
of raids will soon be ended forever, sees that it will be necessary 185
to demand from the soil the means of subsistence which raids 176
formerly procured. So he has announced his intention of having
a foggara dug at "Endid" and of having gardens made there,
and his example will very probably be followed. This is an
undertaking which will certainly be encouraged and supported,
and which shows the slow evolution which is beginning to take
place among the Tuareg, in the best interests of peace and
civilization.

7:Nicolaisen E-5 (1951-1962) 1963 MS25 Tuareg MS25

many tribes of the northern desert, and migrations are on the whole independent of caravan trading. Migrations are to some extent determined by agriculture in cases where the households possess irrigated gardens cultivated on their behalf by the *Ḥarratin* (*Izeggaren*). Some goat-camps may move their tents close to the agricultural settlements when wheat and barley are harvested in April. Date palm-owning Tuareg of two vassal tribes (*Iklan-en-tawsit* and *Ikechchemaden*) will also visit the oases of Silet and Tibeghin where dates are harvested in August and September. But the Tuareg visiting these oases will generally not take flocks and tents with them when collecting their dates, which are harvested mainly by black-skinned *Ḥarratin* of Abalessa. It should once more be mentioned that most Ahaggar tribes in dry years keep their camel herds outside of Ahaggar – mainly in Tamesna – and the members of a section have their herds guarded collectively in these distant regions.

The territory of a vassal tribe is generally divided into sub-areas, the right to which is vested in individual tenants. These sub-areas may be valuable grazing grounds, but most of them have an economic value in other respects also. Some are important hunting grounds for barbary sheep or for the catching of wild donkeys for domestication, others have a value for the collection of wild seeds, or have soil and water suitable for agriculture. A few areas possess all these qualities. I have studied the division of the tribal territory into sub-areas only in the two tribes *Dag Ṛali* and *Aǧuh-en-tehlé*. In the *Aǧuh-en-tehlé* tribe there is a certain correspondance between sections and sub-areas in the way that most sub-areas belong to individuals of the matrilineage which forms the core of a particular section. Consequently the Tuareg of the *Aǧuh-en-tehlé* tribe sometimes speak of sub-areas as section territories. However, two tribal sections living outside the tribal territory have no particular sub-areas, and one section has two sub-areas, the rights to which are vested in two individual tenants (cf. p. 149). In the *Dag Ṛali* tribe there are more sub-areas than tribal sections, and some sub-areas have two tenants who belong to distinct tribal sections, members of which all have the right to use these sub-areas (cf. p. 148). When a tenant dies his rights to a sub-area should be taken over by a maternal kinsman who lives in the section to which he belongs matrilineally. Tenants of sub-areas are frequently section-leaders. In the lists p. 148–149 where I mention the sub-areas in the *Dag Ṛali* and *Aǧuh-en-tehlé* tribes are indicated the names of tenants, the value of their sub-areas, and the annual land-rent paid to the *Amenukal*, who is the true master of the land inhabited by tribes of the *Kel Ṛela* drum-group.

For the land-rent (*ehéré-n-amadal*) paid to the *Amenukal* the tenants obtain the following rights over their sub-areas:—

(1) They can forbid grazing within their area or in part of it in order that plants may germinate and become fully developed. For plants valuable exclusively for grazing domestic animals the period of protection will be up to two months, but certain plants which have seeds valuable for collecting are protected for three months.

(2) They have the right to half of all the wild donkeys caught in their areas.

(3) They have the right to part of all barbary sheep killed. Foucauld says that in certain hunting grounds the hide and the meat of a slain animal must be given to the tenant, while the hunter can keep only the head, the paunch, and the intestines (Foucauld 1922, p. 81; Foley 1930, p. 43 f.). My own information agrees with Lhote's statement that the tenants in general have the right to the hide,

7:Nicolaisen E-5 (1951-1962) 1963 MS25 Tuareg MS25

241 I, p. 424). Rodd thinks the implement seen by Barth was clearly an importation from the north (Rodd
171 1926a, p. 133), and Feilberg assumes that if the plough was once known in this southern area it might perhaps have disappeared together with shifting cultivation (Feilberg 1931, p. 200). All this may be so, for there has been much contact between Ayr and the regions of Fezzan and Tripolitania in the past. But Barth does not say that he saw a plough but "a kind of plough", which may perhaps point to a type of large hoe drawn by men like that described from Senegambia by Feilberg (cf. Feilberg 1931, p. 169 f.).

243 The plough is unknown in the extensive area inhabited by pastoral Tuareg but this is not so with a kind of shifting cultivation. Pastoral Tuareg of Tasilé-n-Ajjer sow wheat and barley along the river valleys when these have been heavily flooded. Sowing is then done in a very simple way:— Holes are dug into the sandy soil, usually merely with the hand, and a few seeds are put into these holes. Wheat and barley thus sown grow in tufts with a space of 0.30 to 0.50 metres between each, and there seem to be about fifty straws in a normal tuft – the largest tuft I have seen contained about 130 straws (cf. Figs. 128–129). The plots cultivated in this way are generally very small, and the scattered wild plants growing in the plot are not always removed before sowing. The corn plots are left completely to themselves until harvesting, which is done with a sickle (Fig. 143). Primitive corn growing of this type cannot be practised continuously from one year to another in Tasilé-n-Ajjer, and the Tuareg of that region say that a household never grows enough corn in this way to meet its annual needs.

[178] The primitive method of corn growing without artificial irrigation is unknown in Ahaggar nowadays, but it seems as if it was known in the past (cf. Duveyrier 1864, p. 372), and the Ahaggar Tuareg have a particular term (*tawgest*) for a field cultivated without artificial irrigation (cf. Foucauld 1951–52, III, p. 1466).

Rodd states that rain-grown crops could be raised most years in certain parts of Ayr and that in earlier days a fair amount of cereals seems to have been produced in this way in Ayr (Rodd 1926a, p. 133). There is little doubt that this statement is correct, and I think that even in parts of Ahaggar millet could be raised without irrigation in most years, for millet has a very short period of growth.

[221] In Ahaggar (at Abalessa) it is sown in June-July and is harvested in September. Though millet plots are irrigated they are never watered much, and never to the same extent as wheat and barley which are grown in winter. In regard to Ayr, millet in southern villages of the Massif very frequently ripens in two months, and late in summer, at the end of the rains (*akasa*) or in the early dry season (*rarat*).

[252] I have frequently seen well-developed small plots of millet and sorghum around deserted Tuareg camps where a great many seeds are always lost on the ground during the pounding and winnowing of millet for porridge. These self-grown plots, however, are not utilized by the Tuareg as the comparatively

[134] small yield is quickly eaten by the numerous millet-eating birds. Owing to these birds it would be difficult for pastoral Tuareg to grow cereals in flooded valleys like the Tuareg of Tasilé-n-Ajjer, and it is partly for this very reason that the sedentary agriculturists of Ayr grow very little millet. Millet could easily be raised without artificial irrigation during the rains, and, in fact, millet was grown by shifting cultivation not far from Agadez as recently as up to the French occupation of Ayr.

245 In addition to the species of grain mentioned above there is one very important plant which can be grown without artificial irrigation, namely the date palm. In Tasilé-n-Ajjer there are river valleys

7:Nicolaisen E-5 (1951-1962) 1963 MS25 Tuareg MS25

Fig. 130. Semi-wild date palms in the canyon-like Aharhar valley of Tasilé-n-Ajjer. The palms are owned and harvested by pastoral Tuareg.

(Aharhar and Éherir) where "semi-wild" palms are abundant. These palms are owned by pastoral Tuareg of various tribes. Their dates are harvested in the autumn when Tuareg palm owners with their slaves live in straw-huts or huts covered with palm leaves situated among the palm trees.

Similar plantations of palm trees which are left to themselves most of the year are also found in Ahaggar, notably at Silet-Tibeghin. Part of these palms are owned by members of the *Dag Ṛali* tribe (the sections of *Kel Tamasrasset* and *Kel Terhenanet*) and by members of the very small tribe, the *Ikechchemaden*. The palm-owners give as an annual payment to the *Amenukal* of Ahaggar one bunch of dates from all palms which have more than two bunches. The yield of another part of the palms belongs to the vassal tribe *Iklan-en-tawsit* (the sections *Kel Silet* and *Kel Tahaḷa*). For usufructs, members of these two sections make a collective annual payments to the *Amenukal* comprising four bags of dates, twenty goats, two ropes of goat's hair, and five water bags. The dates are harvested by Tuareg of the above mentioned tribes in August-September. Harvesting is done with sickles and is finished in three to four weeks when the palm-owners return to their camps with dates packed in bags and loaded on donkeys and camels. In harvesting their dates most Tuareg are assisted by black-skinned agriculturists (*Ḥarratin*, or *Izeggaren*) of Abalessa who are given a certain amount of dates for their work. These agriculturists build the huts in which the palm-owners live during harvest (cf. p. 338 f.).

7:Nicolaisen E-5 (1951-1962) 1963 MS25 Tuareg MS25

133
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Fig. 131. A *foggara* canal (*dfell*) dug into the sandy river bed from where it is led into the gardens of the valley terrace. Southern Ahaggar, *Tafast*.

245
[423] In Ayr there are also a few pastoral Tuareg who own date palms growing in river valleys, e.g., people of the *Imezzureg* tribe of the *Kel Ferwan* drum-group. These date palms, like those growing half wild in Northern Tuareg countries, yield very small dates of a quality inferior to those grown in the oases under constant supervision by agriculturists. Such dates are used only for local consumption.

IRRIGATION AGRICULTURE IN AHAGGAR

241
175 Irrigation agriculture has been practised since ancient times within certain territories now inhabited by the Northern Tuareg. As early as in Roman times there is reference to *Radames*, *Rat*, and certain oases of the Fezzan, which were visited by Roman Expeditions (Lhote 1955a, p. 113 f.; Duveyrier 1864, p. 249 ff., 266 ff., 275 ff., 455 ff.). Lhote thinks that the oasis of Abalessa in the lowland west of the Ahaggar Massif was also visited by the Roman general Cornelius Balbus (Lhote 1955a, p. 88 f., 113 f., 286), but this, perhaps, is to be doubted. In the writings of Medieval Arab authors there is apparently no reference to oases within the Ahaggar country, though oases in neighbouring parts of the Sahara are mentioned.

7:Nicolaisen E-5 (1951-1962) 1963 MS25 Tuareg MS25

243

Fig. 137. The fresh soil carried to old gardens is placed in small heaps to be spread out between the tender plants of wheat and barley. Ahaggar, Abalessa.

241 *andrum sativum*, *Cuminum Cyminum* (*azkar*), *Daucus Carota* (*ezzeruǧet*), *Cucumis melo*, *Lagenaria vulgaris* (cf. Maire 1933, and particularly Maire 1940, p. 401).

248 [262] In addition to the above-mentioned plants there are various types of fruit trees which do not play any considerable rôle for food. The gardens contain very few date palm trees (*tazzayt*, *Phoenix dactylifera*) and there are no palm trees of any value in the gardens situated in the upper mountain zones where the fig tree (*tahart*, *Ficus carica*) thrives much better than in the lower country; the figs are consumed fresh, or they are put on strings for drying, common practise elsewhere in North Africa. The [251] pomegranate (*terrummant*, *Punica Granatum*) is grown in some gardens; its fruits are eaten, and they are [386] also used for dyeing skins (cf. p. 282). Grapes (*tezzebibt*, *Vitis vinifera*) are also grown in some gardens.

Maire mentions the cultivation of the peach (*Prunus Persica*) and the apricot (*Prunus Armeniaca*) (cf. Maire 1940, p. 401). These fruit trees have undoubtedly been quite recently introduced for Foucauld states that they are not grown in Ahaggar (cf. Foucauld 1951–52, I, p. 79 f.).

243 423 There are nowadays many agriculturists who have their private gardens so that they cultivate their winter crops and their summer crops entirely for their own use. But most agriculturists grow winter crops of wheat and barley on behalf of the Tuareg who are then the true garden owners.

[312] [476] Agriculturists who cultivate their gardens on their own behalf frequently irrigate crops by means of draught animals (zebus) which raise water from wells, but there are also some farmers who cultivate independently without any contract with pastoral Tuareg and nevertheless belong to a *foggara* team.

243 It can be estimated that an independently working agriculturist obtains a total yield of about 700 kilos of wheat and barley grown in winter. Of this yield he gives 10 kilos to the *Amenukal*, or to the

7:Nicolaisen E-5 (1951-1962) 1963 MS25 Tuareg MS25

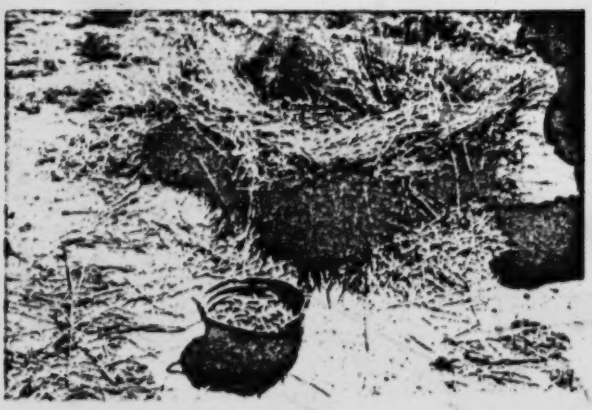

Fig. 142. Tomatoes (*tomatem*; *Solanum lycopersicum* and a type of melon (*tazenut*; *Cucurbita* sp.) cut into slices and left upon a layer of straw for drying. A basket (*tésenit*) filled with ears of millet (*éwélé*) is seen in the front. Abaggar, *Ahl Azzi* Arabs.

from Constantinople, and the true *Imeggedezen*, it is said, came from the same region. They were kinsmen of the Sultan who came to see their relative Sultan as guests or visitors and therefore acquired the name "*Imeggedezen*". They founded the city of Agadez, though it is said that sedentary people of the *Itésen* group of Tuareg were already living at this place. The city of Agadez seems to have been founded in the 15th century shortly after the foundation of the Sultanry which was established 1405 A.D. (cf. p. 414 f.). I shall return to the problems connected with the establishment of Agadez in a later chapter, and shall here content myself by saying that Agadez was established as a trading post, which also became the seat of government of Ayr, and the town never seems to have been a true agricultural settlement. There are no gardens, and even drinking water is very scarce and fetched by the women from outside of the city at wells and in river beds. The *Imeggedezen* are mainly city dwellers though there is a small population of agricultural *Imeggedezen* that possesses gardens at Alarses, a few kilometres north-east of Agadez.

In Barth's days the main language of the sedentary Agadez population was *Sonray* (Barth 1857, I, p. 504). This is still spoken by a few people within the city, and it constitutes the traditional language of the people inhabiting the oasis of Ingal (1.430) west of Agadez. These Sonray-speaking people of Ingal, known to the Tuareg as *Isawegen*, subsist mainly upon their palms which yield dates of an excellent quality, and they do not otherwise engage much in agricultural activity. In the winter season some of these people settle in Tegidda-n-tésemt towards the north to work in the salt pits. Trade and crafts are also important industries to the sedentary people of Ingal, which owns a market.

Throughout the Ayr Massif there are many agricultural villages in which the farmers live in straw-huts, and in houses built of stone and mud (cf. p. 327 ff., Figs. 246 ff.). Most people of these villages belong to the group of *Kel Ewey* Tuareg, but there are also some agriculturists who belong to other Tuareg groups, e.g., the *Itésen* (cf. p. 330, 412, 414, 417 f.). The *Kel Ewey* Tuareg originally came from the north as true fair-skinned Tuareg, but in Ayr they mixed with an ancient negroid and Hausa-speaking population that subsisted on agriculture.

7:Nicolaisen E-5 (1951-1962) 1963 MS25 Tuareg MS25

by many Tuareg, who say that they have not always known this white cotton, though indigo cotton has been introduced from the Sudan since very remote times). Maize has a normal period of growth of about three months, and two – in certain places perhaps even three – yields are taken in the hot seasons.

In addition to the above-mentioned cereals there are various kinds of vegetables grown in the Ayr gardens. Tomatoes (*tomatem*; *Solanum lycopersicum*) are grown at most seasons with the exception of the dry and very hot summer period (*éwilen*). Also common in the Ayr gardens is the sweet potato (*dankale*; *Ipomoea Batatas*), which is sown at the beginning of the rains and harvested in winter. The true potato (*batata*; *Solanum tuberosum*) has been introduced more recently, and is grown mainly to be sold to European households in Agadez. It is grown in Eastern Ayr (Tabello). Melons (*Cucumis melo*) and water melons (*Colocynthis citrullus*) are grown all over Ayr and there are different vegetables such as onions (*Allium cepa & A. sativum*), which are harvested at most seasons. Two plants are grown mainly because they are important as admixtures to porridge sauce. One is called *ékabewwa* (*Corchorus olitorius*); it has maize-like seeds which are pounded in a mortar for sauce-making. The other plant is known as *malokhiya* (*Corchorus tridens*); its leaves are dried and pounded for sauce (cf. p. 243). The latter plant also grows wild outside the gardens. There are in Ayr also certain spice-plants, e.g., *Capsicum annuum & C. frutescens*. To all these cultivated plants can be added certain fruit trees, such as the date palm (*talesdar*; *Phoenix dactylifera*), the fig tree (*tahart*; *Ficus carica*) grown in the mountains, and the lemon tree (*lemon*; *Citrus aurantifolia*) which is grown in Southern Ayr; it yields very small fruit which remains green even when ripe. It should finally be mentioned that the cotton plant (*ebduga*; *Gossypium hirsutum*) is also grown in some gardens of Southern Ayr. According to Miré and Gillet it was introduced into Ayr by the Hausa, but the plant has also been introduced further north in the Sahara in Tawat (Miré & Gillet 1956, p. 244). As stated by Rodd, the cotton plant is rare in Ayr and has perhaps been recently introduced into this region (Rodd 1926a, p. 132). There are many other cultivated plants in Ayr, but the above mentioned constitute the most important species.

In Ayr, as in the north, irrigated cereals form the basis of agriculture. Irrigation is carried out by means of a system introduced from the north, and the agricultural techniques largely resemble those of that section of the Sahara inhabited by Northern Tuareg, though there are certain differences. A new garden in Ayr is prepared by cutting and burning away the wild vegetation of trees, bushes, herbs, and grasses. By crop rotation (wheat and barley in winter; maize, millet, and sorghum in summer) it is possible to cultivate the same garden plot for a few years in succession – up to six or seven years, it is said. After this time it becomes necessary to make a new garden, or to manure the old garden plot with camel and cow dung whilst manure (*taki*) from other animals or from human beings is said not to be used, as it would cause the crops to become inedible. A well-manured garden plot can be cultivated continuously for about fifteen years. But fertilizing is not practised by all agriculturists, and to my knowledge they do not carry fresh soil to the garden plots as is the case with the agriculturists of Ahaggar. Agriculture in Ayr therefore frequently resembles shifting cultivation, though plots are irrigated, and deserted garden land is frequently seen in the valleys where agriculture is practised.

7:Nicolaisen E-5 (1951-1962) 1963 .MS25 Tuareg MS25

AGRICULTURAL IMPLEMENTS AND THE PRESERVATION OF CROPS

The hoe forms the basic agricultural implement in Ahaggar and in Ayr. The type of hoe used in Ahaggar is known as *agelhim*, and it is akin to that in general use among irrigation farmers of the northern oases. It has a very large and heavy iron head provided with a ring for the shaft. I believe that this type of hoe is particularly fitted for irrigation work, but it does not seem to be in general use in Ayr. I have seen it at Iferwan in Northern Ayr where agriculturists have much contact with Tasilé-n-Ajjer, but I have not seen it further south in the Massif where it seems to be unknown. The common type of hoe in Ayr is different; it is named *tagumit* and is hafted by means of a tongue (Fig. 143d). The same type of hoe is widely distributed in Africa south of the Sahara, and it is perhaps to be considered the oldest type of iron hoe within the continent (cf. Feilberg 1934, p. 228–278).

The hoe is used for agricultural work in general, for digging irrigation canals, making garden beds, and for the preparation of the soil. The hoe is not used for sowing cereals. Sowing in Ayr is known as *anabal* and is performed in the following way:— As many seeds as can be kept between the first and second fingers are pressed a little into the soil, and water is led into the garden beds immediately after sowing. I have myself never watched sowing, but I was told in Ayr that it was frequently done by old women. I think that this is probably connected with the belief in the mystic power known as *elbaraka* so characteristic of all North African peoples. For cereals contain this mystic power, which can be spoiled by unclean women. It is considered harmful to the *elbaraka* blessing if cereals are handled by menstruating women (cf. Westermarck 1926, I, p. 230). The hoe is used for weeding, but the agriculturists of Ayr also have a special implement for this particular task. This is known as *elgechwad* and consists of a curved semi-circular iron blade hafted to a short wooden handle by means of a tongue (Fig. 143e). The semi-circular blade is sharpened at its outer and convex side which is pushed against the roots of weeds.

Various methods are used for the harvesting of crops. In Ahaggar and in Tasilé-n-Ajjer wheat and barley are always harvested by means of a sickle (*amreh*) (Fig. 143a-b). The sickle in Ayr is known as *elgechwad*, like the weeding implement mentioned above. It is not used for harvesting crops, but for the cutting of annual grasses to be stored for fodder (Fig. 143f). In Ayr both wheat and barley are harvested by drawing the straws from the ground with the hands. In Ahaggar and Tasilé-n-Ajjer sickles are also used for harvesting dates, while the date-growing agriculturists of Ayr use another method. They do not cut the bunches, but proceed in the following way:— When dates begin to ripen they enclose every bunch in a plaited pouch to protect the fruit from the ravens and other birds. The dates are harvested one by one when they are ripe, while those not yet fully ripe are left to be harvested later. Harvest is done in this manner about once a week until all dates have become ripe. Maize in Ayr is harvested by drawing the plant from the ground with the hand, and this work is normally facilitated by loosening the soil around the roots by means of the hoe. I do not know how maize is harvested in Ahaggar, where this plant is not so widely grown as in Ayr. Everywhere among agricultural people of Ahaggar and Ayr millet and sorghum are cut with a knife (Ahaggar, *elmusi*; Ayr, *ezegiz*) (Figs. 171–172).